

**A SPIN-VALVE SENSOR WITH PINNING LAYERS COMPRISING
MULTIPLE ANTIFERROMAGNETIC FILMS**

ABSTRACT OF THE INVENTION

A spin-valve sensor with pinning layers comprising multiple antiferromagnetic films is disclosed. The multiple antiferromagnetic films are preferably selected from the same Mn-based (Ni-Mn or Pt-Mn) alloy system. The Mn content of the antiferromagnetic film in contact with the reference layer of the spin-valve sensor is selected in order to maximize its exchange coupling to the reference layer, thereby providing a high unidirectional anisotropy field for proper sensor operation. The Mn content of the other antiferromagnetic films not in contact with the reference layer of the spin-valve sensor is reduced in order to maximize the thermal stability and corrosion resistance of the spin-valve sensor for robust sensor operation at high temperatures in disk drive environments.

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